

# PATENT ABSTRACTS OF JAPAN

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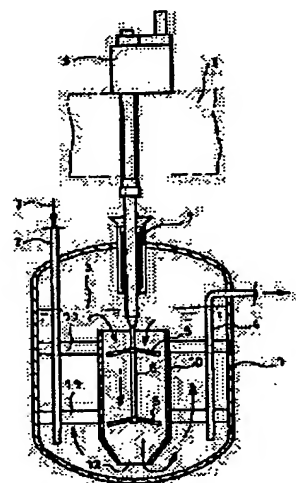
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## (54) REPROCESSING PRESSURE VESSEL

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To restrain radioactive waste liquid fluidized by the rotation of agitation blades, from inducing the vibration of an internal structure by providing a cylindrical body submerged under the liquid level in a vessel body and vertically extended surrounding the agitation blades.

**SOLUTION:** A cylindrical body 10 submerged under the liquid level of radioactive waste liquid and vertically extended surrounding agitation blades 5 is provided in the center position in a vessel body 1, being supported to the internal wall of the vessel body 1 by supports 11. The lower end of the cylindrical body is throttlingly formed to reduce its bore diameter gradually downward to form a nozzle hole 12. When the agitation blades 5 are rotated to form downflow to the radioactive waste liquid in the vessel body to make it flow, the downflow flows down being guided by the cylindrical body 10 to reach a bottom part and then turns around to become flow that ascends around the cylindrical body 10. The flow of the radioactive waste liquid 3 from the lateral direction weak in strength is therefore prevented from colliding directly with an internal structure such as a waste liquid feed pipe 2 and a waste liquid drain pipe 4.



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**CLAIMS**

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[Claim(s)]

[Claim 1] The pressurized container for rework characterized by preparing the tube-like object which sinks into the bottom of the oil level within said body of a container, and surrounds said stirring aerofoil in the pressurized container for rework which arranged the stirring aerofoil pivotable so that the downward flow of a radioactive effluent could be formed in the body of a container which stores a radioactive effluent temporarily and is suitably paid out to a waste fluid processor, and is prolonged in the vertical direction.

[Claim 2] The pressurized container for rework according to claim 1 characterized by having extracted [ that the aperture gradually decreases to the lower part sense, and ] the lower limit section of a tube-like object, and forming it.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the pressurized container for rework.

[0002]

[Description of the Prior Art] Generally, the radioactive effluents of a high level are collected to the pressurized container for rework, and it stores temporarily, it pays out of this pressurized container for rework to a waste fluid processor suitably in the reprocessing facility of the fuel rod used in the nuclear power plant, and is made to perform suitable processing.

[0003] By drawing 2 showing an example of the conventional pressurized container for rework, one in drawing shows the body of a container which accomplishes the outer shell of the pressurized container for rework, and a radioactive effluent 3 is introduced into this body 1 of a container through the waste fluid supply pipe 2, and it is stored temporarily, and a radioactive effluent 3 pays out to a waste fluid processor suitably through the waste fluid exhaust pipe 4.

[0004] Since there is a possibility of the pars basilaris ossis occipitalis of the body 1 of a container being overheated with the decay heat which that precipitate emits, and fusing when the solid content

tinctured with activity is contained in the radioactive effluent 3 collected by this kind of pressurized container for rework and this solid content precipitates at the pars basilaris ossis occipitalis of the body 1 of a container, it is necessary to stir the radioactive effluent 3 within the body 1 of a container, and to hold solid content in the diffusion condition so that such a situation may be avoided beforehand.

[0005] Then, the radioactive effluent 3 within the body 1 of a container is stirred, and it is made for precipitate of solid content to have not happened by the stirring aerofoil's 5 being supported by the rotation shaft 6 pivotable so that the downward flow of a radioactive effluent 3 can be formed, and rotating this stirring aerofoil 5 to the mid gear within the body 1 of a container, and making it fluidize a radioactive effluent 3.

[0006] In addition, said rotation shaft 6 penetrates the head-lining section of the body 1 of a container free [ rotation ] through a seal 7, is prolonged up, is connected with the driving gear 9 isolated with the radioactive contamination environment with the biological shield wall 8, and a rotation drive is carried out with this driving gear 9.

[0007]

[Problem(s) to be Solved by the Invention] however, in the body 1 of a container of this kind of pressurized container for rework Since it has many long picture up and down internals called instrumentation tubing which connoted measuring instruments which are not illustrated besides waste fluid supply pipe [ which has been illustrated ] 2 or waste fluid exhaust pipe 4, such as a thermometer and a density meter When a radioactive effluent 3 is fluidized by rotation of the stirring aerofoil 5, the flow from a longitudinal direction weak in reinforcement collides from the stirring aerofoil 5 directly to an internal, and there is a possibility that induction of the vibration may be carried out to an internal by this. To eye others It will be necessary to raise the rigidity of the internal itself or to increase the number of the supports which support an internal, and there was a problem that facility cost soared sharply.

[0008] This invention is what was made in view of the above-mentioned actual condition, and the effect the radioactive effluent fluidized by rotation of a stirring aerofoil affects an internal is eased, and it aims at offering the pressurized container for rework which enabled it to control that induction of the vibration is carried out to this internal.

[0009]

[Means for Solving the Problem] This invention is characterized by preparing the tube-like object which sinks into the bottom of the oil level within said body of a container, and surrounds said stirring aerofoil, and is prolonged in the vertical direction in the pressurized container for rework which arranged the stirring aerofoil pivotable so that the downward flow of a radioactive effluent could be formed in the body of a container which stores a radioactive effluent temporarily and is suitably paid out to a waste fluid processor.

[0010] Therefore, if downward flow is formed in the radioactive effluent within the body of a container by rotation of a stirring aerofoil and it is made to fluidize in this invention Since the downward flow serves as flow which flows down showing around with a tube-like object, results in the pars basilaris ossis occipitalis of the body of a container, turns up upward here, and goes up the perimeter of said tube-like object It is lost that the flow from a longitudinal direction weak in reinforcement collides directly to the internal of the perimeter of a stirring aerofoil, and since the effect the radioactive effluent fluidized by this by rotation of a stirring aerofoil affects an internal is eased sharply, it is controlled that induction of the vibration is carried out to this internal.

[0011] Moreover, in this invention, it is desirable to extract [ that the aperture gradually decreases to the lower part sense and ] the lower limit section of a tube-like object, and to form it, if it does in this way, the rate of flow of the radioactive effluent which flows out of the lower limit section of a tube-like object will be raised, and stirring capacity will improve.

[0012]

[Embodiment of the Invention] The gestalt of operation of this invention is explained below, referring to a drawing.

[0013] Drawing 1 shows an example of a gestalt which carries out this invention, and the part which attached the same sign as drawing 2 expresses the same object.

[0014] In this example of a gestalt, to the mid gear within the body 1 of a container constituted like the thing of drawing 2 mentioned above so that it may illustrate Especially in the example which the tube-like object 10 which sinks into the bottom of the oil level of a radioactive effluent 3, and surrounds the stirring aerofoil 5, and is prolonged in the vertical direction is supported by body of container 1 wall by support 11, is prepared, and is illustrated The lower limit section of said tube-like object 10 extracts [ dwindling the aperture to the lower part sense, and ], is formed, and serves as the nozzle opening 12.

[0015] If it \*\*, downward flow is formed in the radioactive effluent 3 within the body 1 of a container by rotation of the stirring aerofoil 5 and it is made to fluidize Since the downward flow serves as flow which flows down showing around with a tube-like object 10, results in the pars basilaris ossis occipitalis of the body 1 of a container, turns up upward here, and goes up the perimeter of said tube-like object 10 It is lost that the flow from a longitudinal direction weak in reinforcement collides directly to internals, such as the waste fluid supply pipe 2, the waste fluid exhaust pipe 4, etc. of stirring aerofoil 5 perimeter. By this Since the effect the radioactive effluent 3 fluidized by rotation of the stirring aerofoil 5 affects an internal is eased sharply, it is controlled that induction of the vibration is carried out to this internal.

[0016] Moreover, especially in this example of a gestalt, since the lower limit section of a tube-like object 10 was extracted [ that the aperture gradually decreases to the lower part sense, and ] and is formed, the rate of flow of the radioactive effluent 3 which flows out of the lower limit section of a tube-like object 10 is raised, and stirring capacity improves.

[0017] Therefore, since vibration by which the radioactive effluent 3 fluidized by rotation of the stirring aerofoil 5 eases sharply the effect affect an internal, and induction is carried out to this internal can be controlled remarkably according to the above-mentioned example of a gestalt, the rigidity of the internal itself can be mitigated conventionally, or the number of the supports which support an internal can be reduced, and large reduction-ization of the facility cost concerning the pressurized container for rework can be planned.

[0018] Moreover, since the rate of flow of the radioactive effluent 3 which flows out of the lower limit section of a tube-like object 10 is raised and stirring capacity is made to improve, even if it uses the stirring aerofoil 5 comparatively small like illustration or reduces the number of installation of the stirring aerofoil 5, required stirring capacity (the rate of flow of the radioactive effluent 3 which may stir precipitate) can be acquired, and the facility cost concerning the pressurized container for rework can be reduced further.

[0019] In addition, as for the pressurized container for rework of this invention, it is needless to say that modification can be variously added within limits which are not limited only to the above-mentioned example of a gestalt, and do not deviate from the summary of this invention.

[0020]

[Effect of the Invention] According to the pressurized container for rework of above-mentioned this invention, the effectiveness which was excellent in the versatility like the following can be done so.

[0021] (I) Since vibration by which the radioactive effluent fluidized by rotation of a stirring aerofoil eases sharply the effect affect an internal, and induction is carried out to this internal can be controlled remarkably according to invention of this invention according to claim 1, the rigidity of the internal itself can be mitigated conventionally, or the number of the supports which support an internal can be reduced, and large reduction-ization of the facility cost concerning the pressurized container for rework can be planned.

[0022] (II) Since according to invention of this invention according to claim 2 the rate of flow of the radioactive effluent which flows out of the lower limit section of a tube-like object can be raised and stirring capacity can be improved, even if it uses a comparatively small stirring aerofoil or reduces the number of installation of a stirring aerofoil, required stirring capacity (the rate of flow of the radioactive

effluent which may stir precipitate) can be acquired, and the facility cost concerning the pressurized container for rework can be reduced further.

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] It is the outline sectional view showing an example of a gestalt which carries out this invention.

[Drawing 2] It is the outline sectional view showing an example of the conventional pressurized container for rework.

[Description of Notations]

1 Body of Container

2 Waste Fluid Supply Pipe (Internal)

3 Radioactive Effluent

4 Waste Fluid Exhaust Pipe (Internal)

5 Stirring Aerofoil

10 Tube-like Object

12 Nozzle Opening (Lower Limit Section Extracted and Formed)

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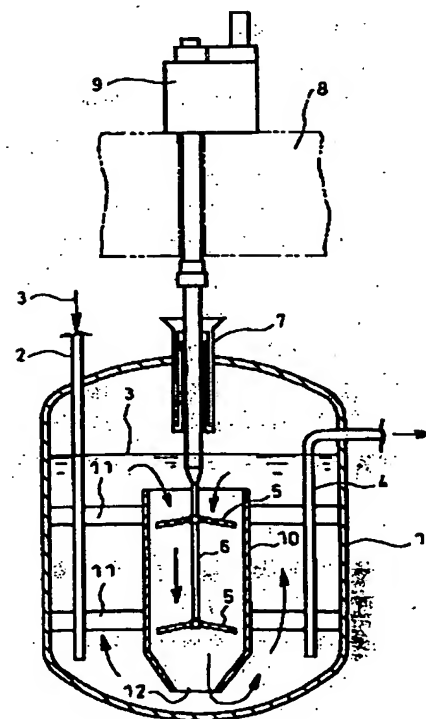
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(54) 【発明の名称】 再処理用圧力容器

(57) 【要約】

【課題】 攪拌翼の回転により流動化された放射性廃液が内部構造物に及ぼす影響を緩和して、該内部構造物に振動が誘起されることを抑制し得るようにした再処理用圧力容器を提供する。

【解決手段】 放射性廃液3を一時的に貯留して適宜に廃液処理系へ払い出す容器本体1内に、放射性廃液3の下降流を形成し得るよう攪拌翼5を回転可能に配設した再処理用圧力容器に関し、前記容器本体1内の液面下に没し且つ前記攪拌翼5を包囲して上下方向に延びる筒状体10を設ける。



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## 【特許請求の範囲】

【請求項1】 放射性廃液を一時的に貯留して適宜に廃液処理系へ払い出す容器本体内に、放射性廃液の下降流を形成し得るよう攪拌翼を回転可能に配設した再処理用圧力容器において、前記容器本体内の液面下に没し且つ前記攪拌翼を包囲して上下方向に延びる筒状体を設けたことを特徴とする再処理用圧力容器。

【請求項2】 筒状体の下端部を、その口径が下方向きに漸減するよう絞り形成したことを特徴とする請求項1に記載の再処理用圧力容器。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、再処理用圧力容器に関するものである。

【0002】

【従来の技術】一般的に、原子力発電所で使用された燃料棒の再処理施設においては、高レベルの放射性廃液を再処理用圧力容器に収集して一時的に貯留し、この再処理用圧力容器から適宜に廃液処理系へ払い出して適切な処理を施すようにしている。

【0003】図2は従来の再処理用圧力容器の一例を示すもので、図中1は再処理用圧力容器の外殻を成す容器本体を示し、該容器本体1には、廃液供給管2を介し放射性廃液3が導入されて一時的に貯留され且つ廃液排出管4を介し放射性廃液3が適宜に廃液処理系へと払い出されるようになっている。

【0004】この種の再処理用圧力容器に収集される放射性廃液3には、放射能を帯びた固形分が含まれており、この固形分が容器本体1の底部に沈殿してしまうと、その沈殿物が発する崩壊熱により容器本体1の底部が過熱して溶融してしまう虞れがあるため、このような事態を未然に回避し得るよう容器本体1内の放射性廃液3を攪拌して固形分を拡散状態に保持する必要がある。

【0005】そこで、容器本体1内における中央位置には、放射性廃液3の下降流を形成し得るよう攪拌翼5が回転シャフト6により回転可能に支持されており、この攪拌翼5を回転して放射性廃液3を流動化させることにより、容器本体1内の放射性廃液3を攪拌して固形分の沈殿が起こらないようにしてある。

【0006】尚、前記回転シャフト6は、容器本体1の天井部をシール7を介し回転自在に貫通して上方に延び、生体遮蔽壁8により放射能汚染環境と隔絶された駆動装置9に連結されて、該駆動装置9により回転駆動されるようになっている。

【0007】

【発明が解決しようとする課題】しかしながら、この種の再処理用圧力容器の容器本体1内には、図示してある廃液供給管2や廃液排出管4以外にも、図示しない温度計や密度計などの計測器を内包した計装管といった上下に長尺な内部構造物が多く備えられているので、攪拌翼

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5の回転により放射性廃液3が流動化された際に、強度的に弱い横方向からの流れが攪拌翼5から内部構造物に対し直接的に衝突し、これによって、内部構造物に振動が誘起される虞れがあり、そのために、内部構造物自体の剛性を高めたり、内部構造物を支持するサポートの数を増やしたりする必要が生じ、設備コストが大幅に高騰するという問題があった。

【0008】本発明は上述の実情に鑑みてなしたもので、攪拌翼の回転により流動化された放射性廃液が内部構造物に及ぼす影響を緩和して、該内部構造物に振動が誘起されることを抑制し得るようにした再処理用圧力容器を提供することを目的としている。

【0009】

【課題を解決するための手段】本発明は、放射性廃液を一時的に貯留して適宜に廃液処理系へ払い出す容器本体内に、放射性廃液の下降流を形成し得るよう攪拌翼を回転可能に配設した再処理用圧力容器において、前記容器本体内の液面下に没し且つ前記攪拌翼を包囲して上下方向に延びる筒状体を設けたことを特徴とするものである。

【0010】従って、本発明では、攪拌翼の回転により容器本体内の放射性廃液に下降流を形成して流動化させると、その下降流は筒状体により案内されつつ流下して容器本体の底部に到り、ここで上向きに折り返して前記筒状体の周囲を上昇する流れとなるので、攪拌翼周囲の内部構造物に対し強度的に弱い横方向からの流れが直接的に衝突することがなくなり、これによって、攪拌翼の回転により流動化された放射性廃液が内部構造物に及ぼす影響が大幅に緩和されるので、該内部構造物に振動が誘起されることが抑制される。

【0011】また、本発明においては、筒状体の下端部を、その口径が下方向きに漸減するよう絞り形成することが好ましく、このようにすれば、筒状体の下端部から流出する放射性廃液の流速が高められて攪拌能力が向上される。

【0012】

【発明の実施の形態】以下本発明の実施の形態を図面を参照しつつ説明する。

【0013】図1は本発明を実施する形態の一例を示すもので、図2と同一の符号を付した部分は同一物を表わしている。

【0014】図示する如く、本形態例においては、前述した図2のものと同様に構成した容器本体1内の中央位置に、放射性廃液3の液面下に没し且つ攪拌翼5を包囲して上下方向に延びる筒状体10が、サポート11により容器本体1内壁に支持されて設けられており、特に図示する例では、前記筒状体10の下端部が、その口径を下方向きに漸減するよう絞り形成されてノズル口12となっている。

【0015】而して、攪拌翼5の回転により容器本体1

(3)

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内の放射性廃液3に下降流を形成して流動化させると、その下降流は筒状体10により案内されつつ流下して容器本体1の底部に到り、ここで上向きに折り返して前記筒状体10の周囲を上昇する流れとなるので、攪拌翼5周囲の廃液供給管2、や廃液排出管4などの内部構造物に対し強度的に弱い横方向からの流れが直接的に衝突することがなくなり、これによって、攪拌翼5の回転により流動化された放射性廃液3が内部構造物に及ぼす影響が大幅に緩和されるので、該内部構造物に振動が誘起されることが抑制される。

【0016】また、特に本形態例においては、筒状体10の下端部を、その口径が下方向きに漸減するよう絞り形成しているので、筒状体10の下端部から流出する放射性廃液3の流速が高められて攪拌能力が向上される。

【0017】従って、上記形態例によれば、攪拌翼5の回転により流動化された放射性廃液3が内部構造物に及ぼす影響を大幅に緩和して、該内部構造物に誘起される振動を著しく抑制することができるので、内部構造物自体の剛性を従来より軽減したり、内部構造物を支持するサポートの数を減らしたりして、再処理用圧力容器に掛かる設備コストの大幅な削減化を図ることができる。

【0018】また、筒状体10の下端部から流出する放射性廃液3の流速を高めて攪拌能力を向上するようにしているので、図示の如く比較的小型の攪拌翼5を用いたり、攪拌翼5の設置数を減らしたりしても必要な攪拌能力（沈殿物を攪拌し得る放射性廃液3の流速）を得ることができ、再処理用圧力容器に掛かる設備コストをより一層削減することができる。

【0019】尚、本発明の再処理用圧力容器は、上述の形態例にのみ限定されるものではなく、本発明の要旨を逸脱しない範囲内において種々変更を加え得ることは勿論である。

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【0020】

【発明の効果】上記した本発明の再処理用圧力容器によれば、下記の如き種々の優れた効果を奏し得る。

【0021】(I) 本発明の請求項1に記載の発明によれば、攪拌翼の回転により流動化された放射性廃液が内部構造物に及ぼす影響を大幅に緩和して、該内部構造物に誘起される振動を著しく抑制することができるので、内部構造物自体の剛性を従来より軽減したり、内部構造物を支持するサポートの数を減らしたりして、再処理用圧力容器に掛かる設備コストの大幅な削減化を図ることができる。

【0022】(II) 本発明の請求項2に記載の発明によれば、筒状体の下端部から流出する放射性廃液の流速を高めて攪拌能力を向上することができるので、比較的小型の攪拌翼を用いたり、攪拌翼の設置数を減らしたりしても必要な攪拌能力（沈殿物を攪拌し得る放射性廃液の流速）を得ることができ、再処理用圧力容器に掛かる設備コストをより一層削減することができる。

【図面の簡単な説明】

【図1】本発明を実施する形態の一例を示す概略断面図である。

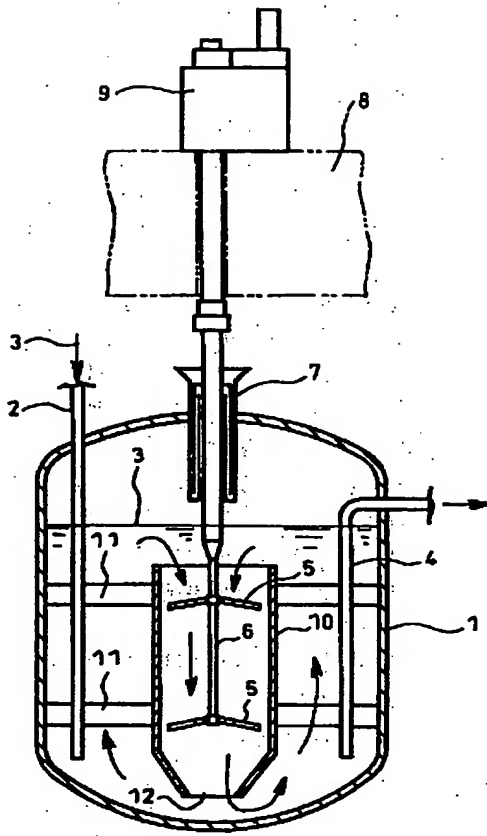
【図2】従来の再処理用圧力容器の一例を示す概略断面図である。

【符号の説明】

- |    |                 |
|----|-----------------|
| 1  | 容器本体            |
| 2  | 廃液供給管（内部構造物）    |
| 3  | 放射性廃液           |
| 4  | 廃液排出管（内部構造物）    |
| 5  | 攪拌翼             |
| 10 | 筒状体             |
| 12 | ノズル口（絞り形成した下端部） |

(4)

【図1】



【図2】

